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U. S. NAVAL TECHNICAL MISSION TO JAPAN
CARE OF FLEET POST OFFICE
SAN FRANCISCO, CALIFORNIA

29 December 1945

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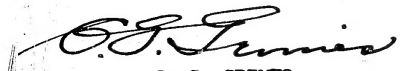
From: Chief, Naval Technical Mission to Japan.
To : Chief of Naval Operations.

Subject: Target Report - Japanese Airborne Radar.

Reference: (a) "Intelligence Targets Japan" (DNI) of 4 Sept. 1945.

1. Subject report, covering Target E-02 of Fascicle E-1 of reference (a), is submitted herewith.

2. The investigation of the target and the target report were accomplished by Comdr. M. C. Mains, USN., Ret.


C. G. GRIMES
Captain, USN

31760

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E-02

JAPANESE AIRBORNE RADAR

"INTELLIGENCE TARGETS JAPAN" (DNI) OF 4 SEPT. 1945

FASCICLE E-1, TARGET E-02

DECEMBER 1945

U.S. NAVAL TECHNICAL MISSION TO JAPAN

SUMMARY

ELECTRONICS TARGETS

JAPANESE AIRBORNE RADAR

The Japanese Navy had only three airborne radars of sufficient interest to merit detailed study. These were the Type 51, 10-centimeter pathfinder radar, the FD-2 night-fighter set on 500 Mc, and the Gyoku-3, 150 Mc, night-fighter set. None of these were in production, and the standard set in use was the Type 3, Air Mark 6, Model 4 (H-6), on 150 Mc.

There was an IFF set in development, the M-13, which was put into service on a small scale. About 600 sets were said to have been produced. The Japanese Army and Navy used different frequencies for their IFF, hence were unable to interrogate each other.

During the course of the investigation of this target, it was ascertained that the subject was being thoroughly covered by the Air Technical Intelligence Group of Far Eastern Air Forces, and to a lesser degree by the Technical Liaison and Investigation Department, Office of Chief Signal Officer. Accordingly, to avoid duplication of effort, all information discovered on airborne radar was made available to those agencies and none was uncovered which is not contained in the referenced reports of those agencies.

This report consists of schematic and block diagrams of Japanese airborne radar sets, including those mentioned above, and a chart of the characteristics of Japanese airborne radar. Details and discussion of this subject can be found in the referenced reports.

Electronic altimeters are covered in NavTechJap Report - "Japanese Navigational Aids", Index No. E-09.

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REFERENCES

Location of Target:

Second Naval Technical Institute, Kanazawa, YOKOHAMA.

Second Naval Technical Institute, Tokyo Branch, 13 Mita, Meguro-Ku, TOKYO.

Japanese Personnel Interviewed:

Vice Adm. NAWA TAKESHI, IJN, Head of Radar and Communications Department, Second Naval Technical Institute, Kanazawa, YOKOHAMA and Meguro-Ku, TOKYO.

Capt. TAKAKARA HISAE, IJN, Head of Direction Finder and Airborne Radar Section, Second Naval Technical Institute.

Mr. Fred K. UYEMINAMI, Second Naval Technical Institute, RDF and Airborne Radar Section. Born in Seattle; graduated from University of Washington, 1933; graduate student at Massachusetts Institute of Technology. Later on staff of WASEDA University and consultant to Japanese Navy. Age, about 33. Speaks fluent English, and acted as interpreter during some of the interviews.

Reports of Other Agencies:

Air Technical Intelligence Group, Electronics Section, Far Eastern Air Forces. (Copies to BuAer and Wright Field).

1. ATIG #14 - Radar and Communication Equipment (Airborne).
2. ATIG #35 - Aircraft Antenna Design,
3. ATIG #115 - A Short Survey of Japanese Radar (Vol VI).
4. ATIG #275 - Japanese IFF.
5. ATIG #276 - Catalog of Radio, Radar and Special Devices.
6. ATIG #277 - List of miscellaneous electronic documents (which were sent to Air Documents Division T-2 Wright Field).

Technical Liaison and Investigation Department (TLID), Office of Chief Signal Officer, Supreme Commander for the Allied Powers (Available through G-2, War Department, Washington, D.C.).

Equipment Seized By Air Technical Intelligence Group (Sent to Wright Field):

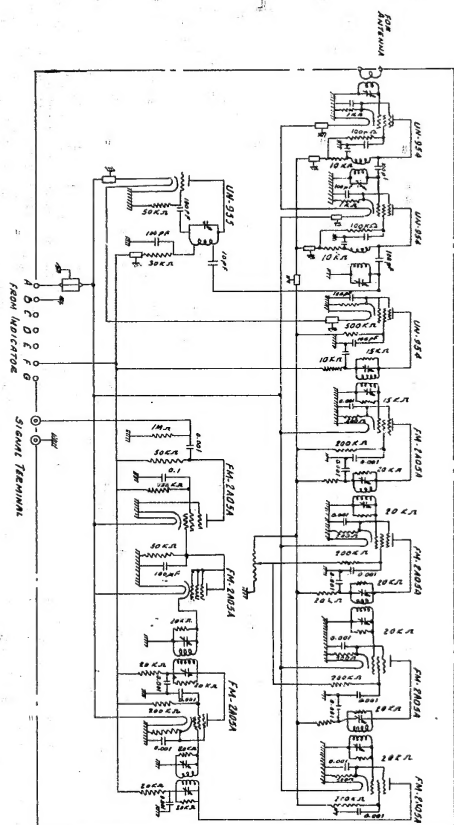
One FD-2 Equipment
One Type 51 Equipment

RESTRICTED

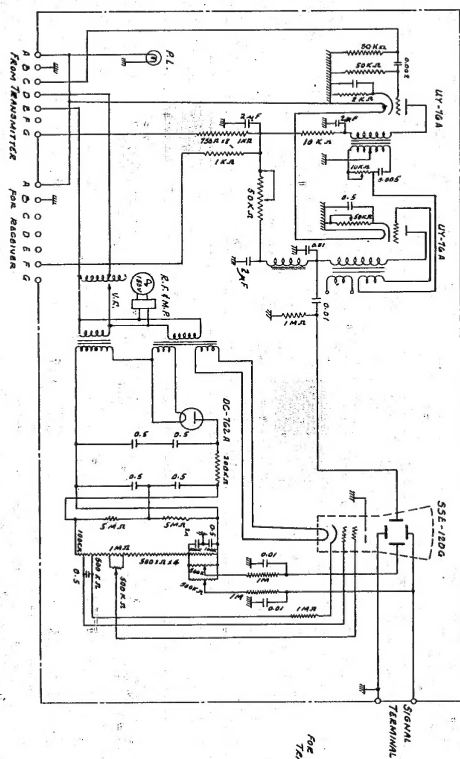
ENCLOSURE (A)

Type 3, Mk 6, Mod 1, (1-1-6) Radar,

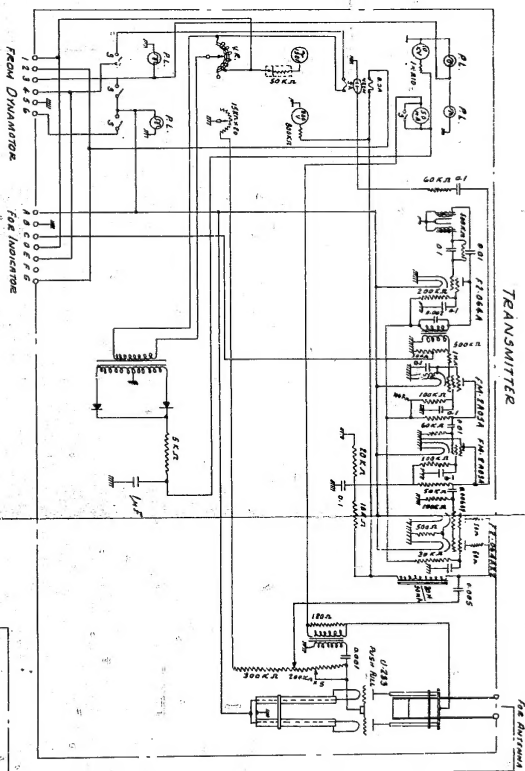
RECEIVER



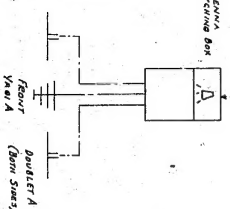
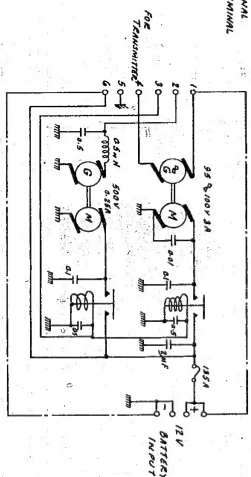
INDICATOR



TRANSMITTER



DYNAMOTOR



FREQUENCY: 150 Mc (7-11)
 OUTPUT: ABOUT 3 KW
 PULSE LENGTH: ABOUT 10-15
 RANGE: ABOUT 60 MILES FOR A BIG SHIP
 ACCURACY: ABOUT 2-3%
 Δθ ABOUT ± 3%

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ENCLOSURE (A), continued

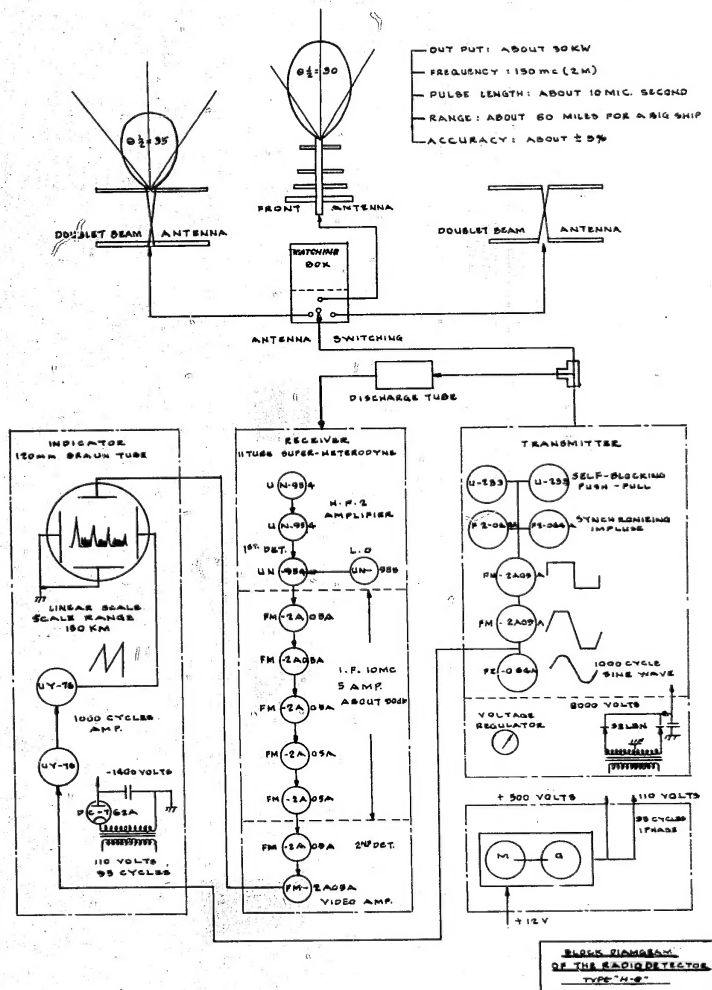
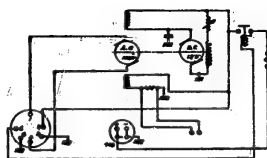
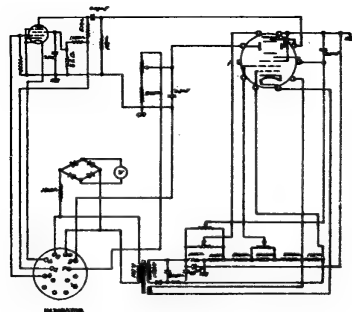
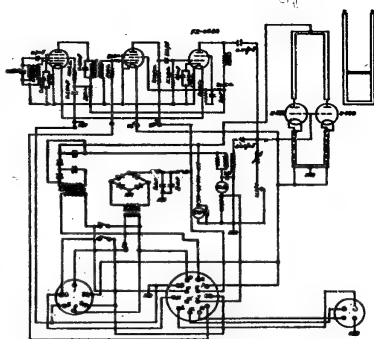


Figure 2(A)

ENCLOSURE (C), continued

FK3



VACUUM RELAY



ALUMINUM

APPROXIMATE WIRING

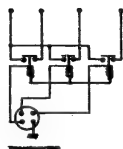


Figure 2(C)

AIRBORNE RADAR TYPE 19, MK 1, MOD 12 (FK-4)

ENCLOSURE (C), continued

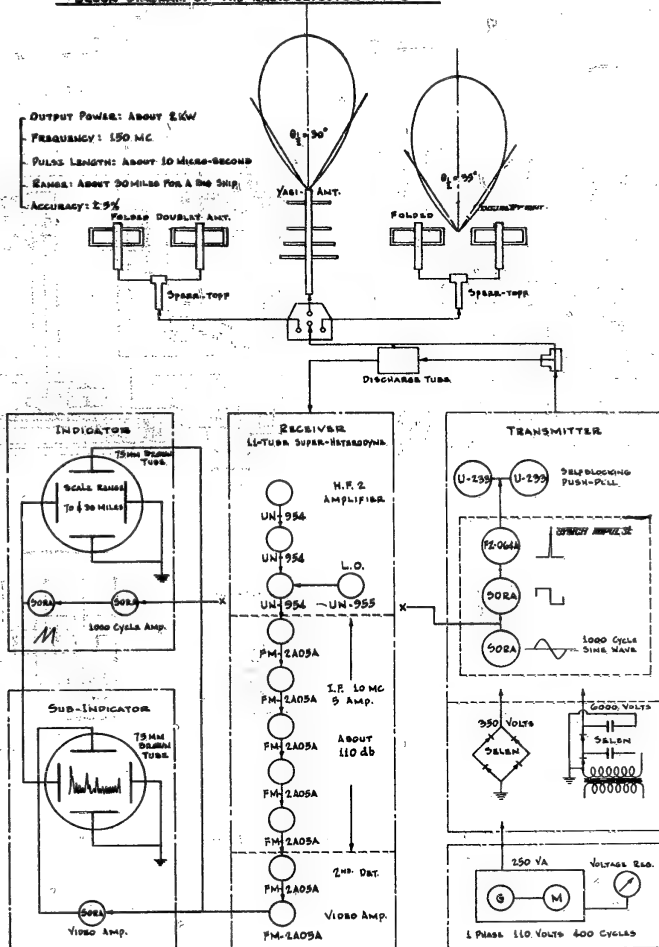
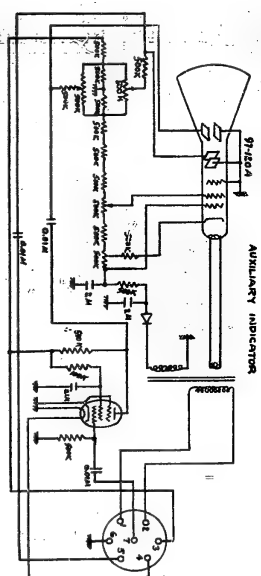
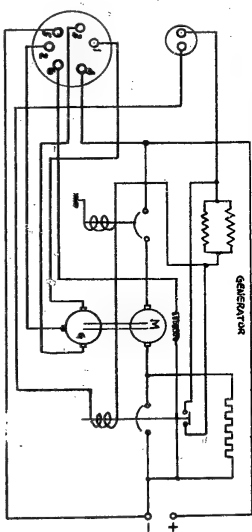
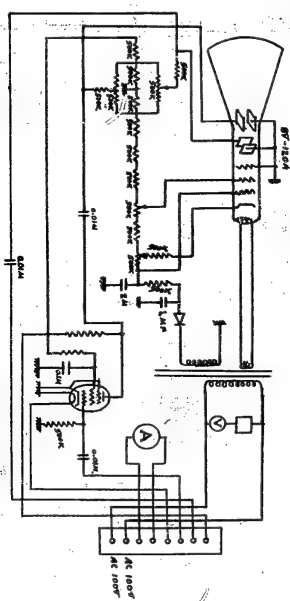
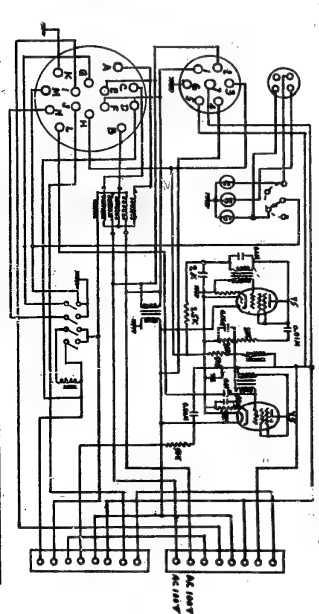
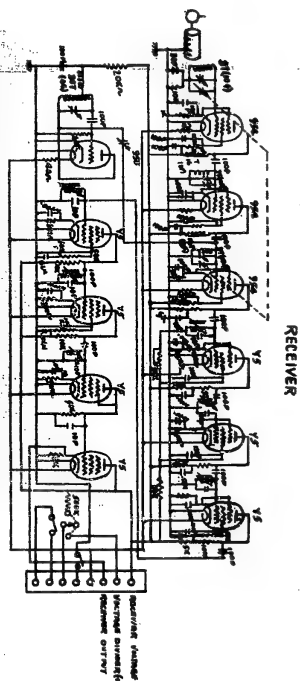
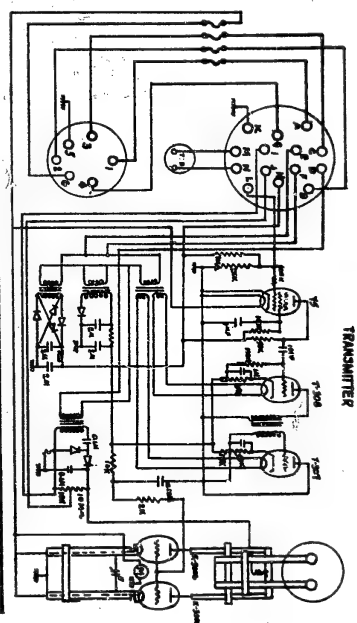
BLOCK DIAGRAM OF THE RADIO-DETECTOR 'FK-3'

Figure 3(C)

ENCLOSURE (D)

WARNING RADAR FOR LARGE AIRCRAFT (PK-4)



ENCLOSURE (D), continued

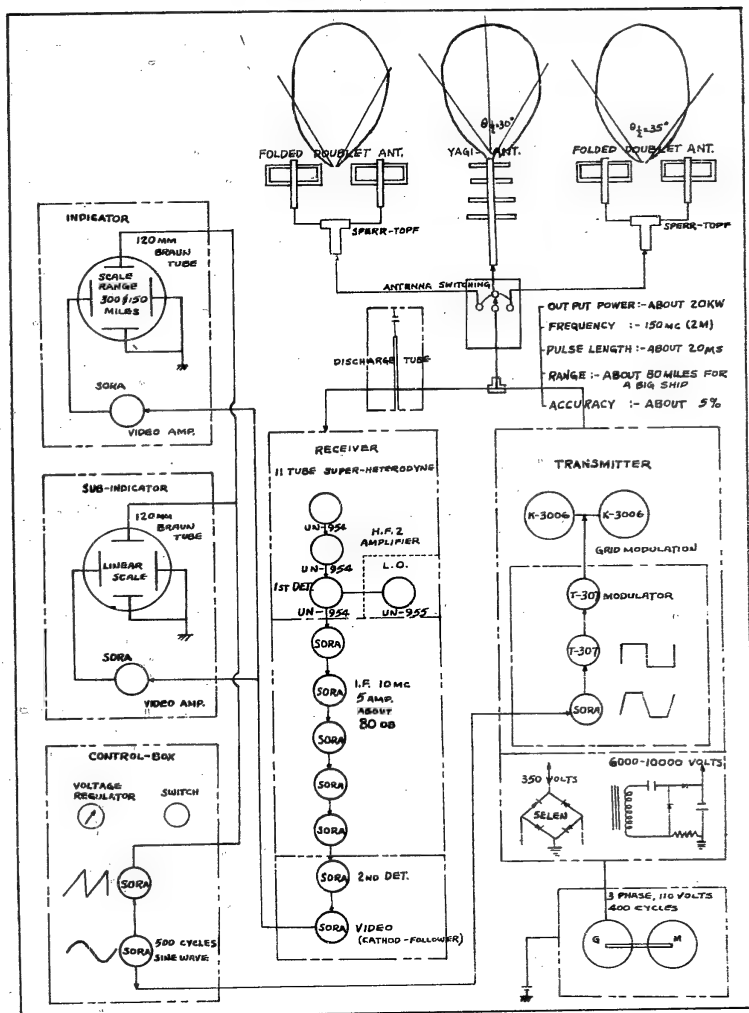
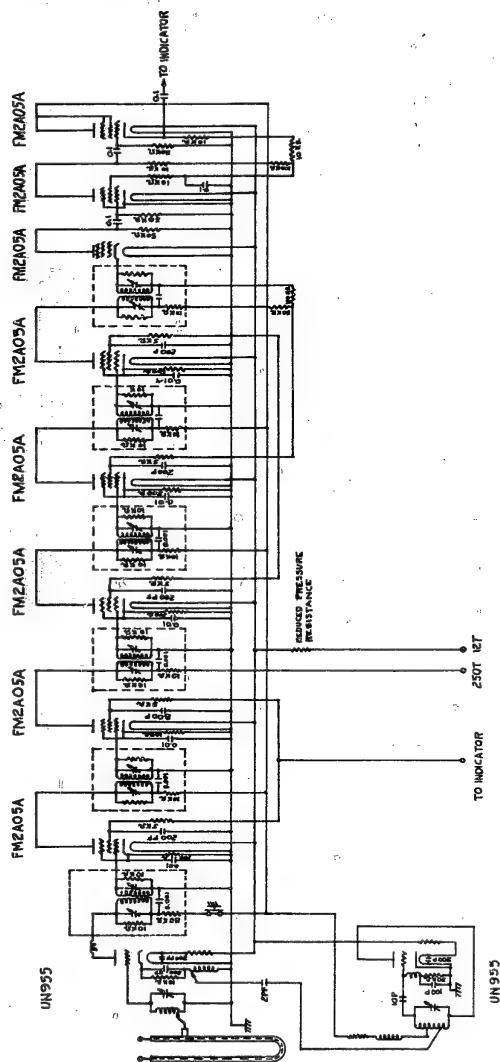


Figure 2(D)
BLOCK DIAGRAM

ENCLOSURE (E)

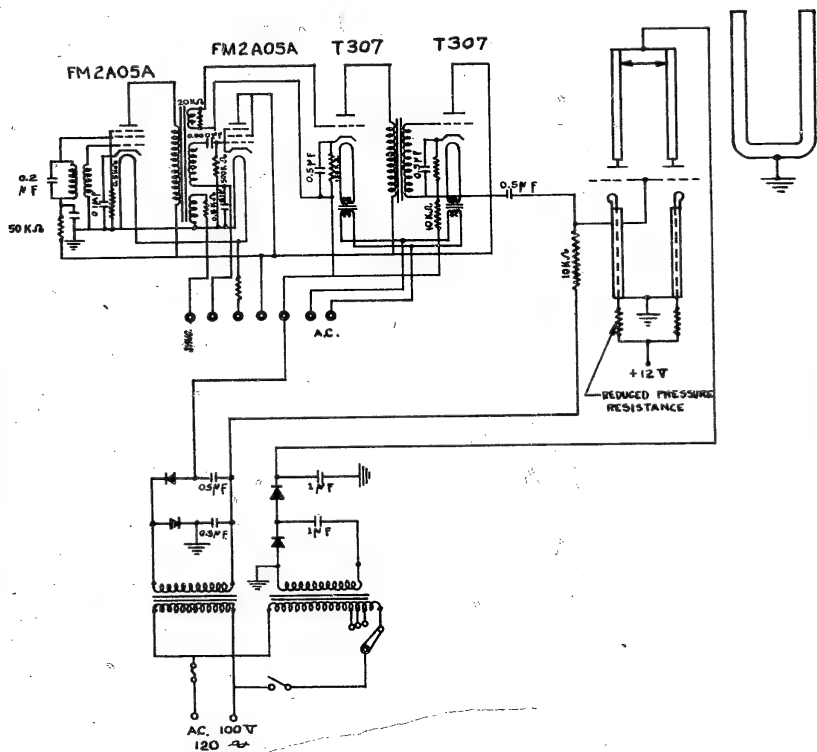
TYPE 19, MK 1, MOD 11 (N-6) RADAR



RECEIVER

ENCLOSURE (E), continued

N6 TRANSMITTER

Figure 2(E)
TRANSMITTER

ENCLOSURE (E), continued

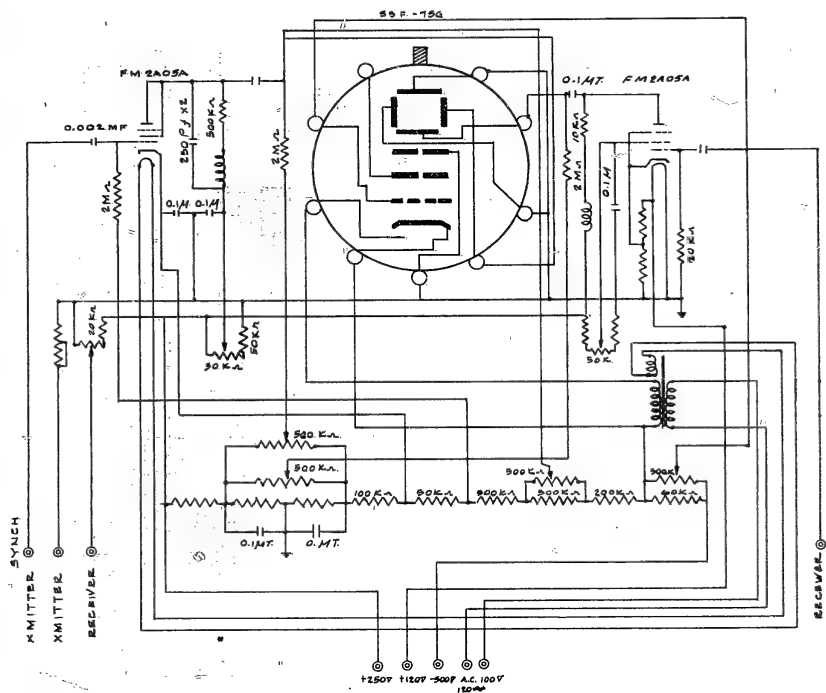
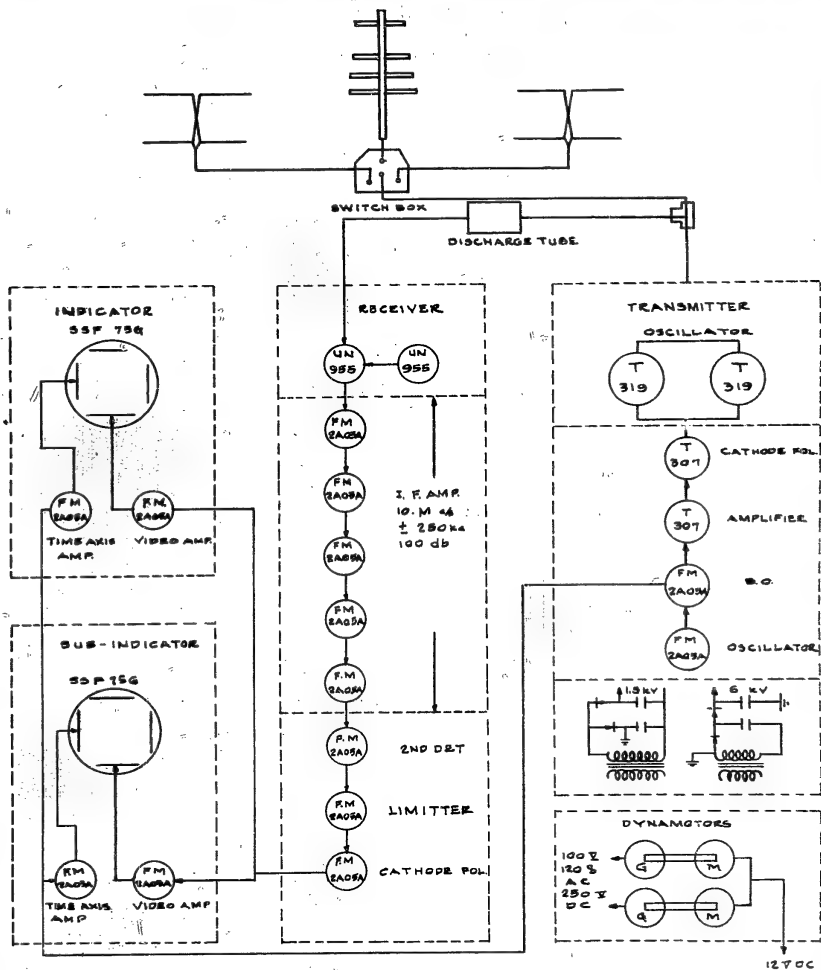


Figure 3(E)
INDICATOR

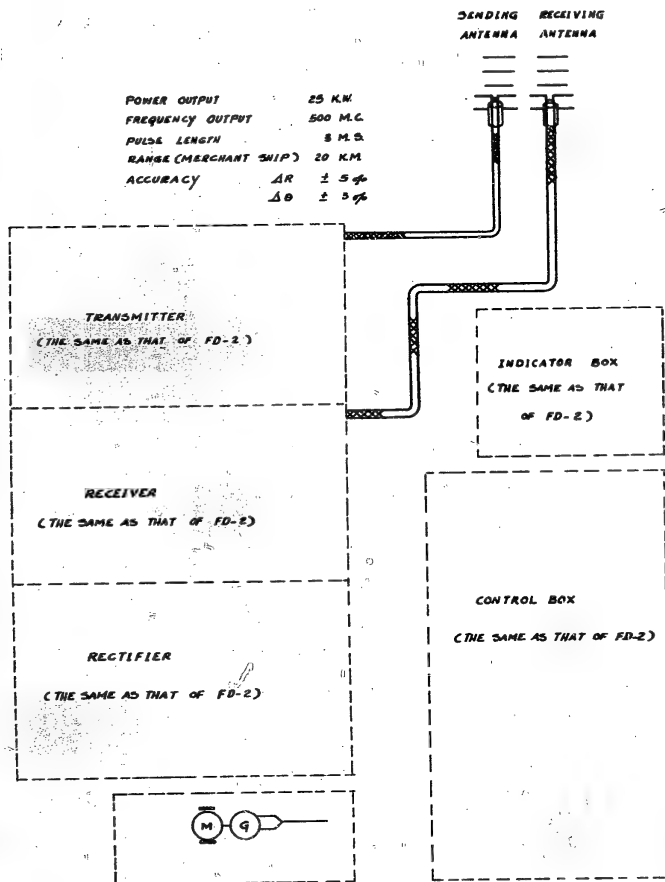


POWER OUTPUT	2 KW
FREQUENCY	250 Mc/sec.
PULSE LENGTH	7 μ sec
RANGE	20 KM FOR A DESTROYER
ACCURACY	± 5 %

Figure 4(E)
BLOCK DIAGRAM

ENCLOSURE (F)

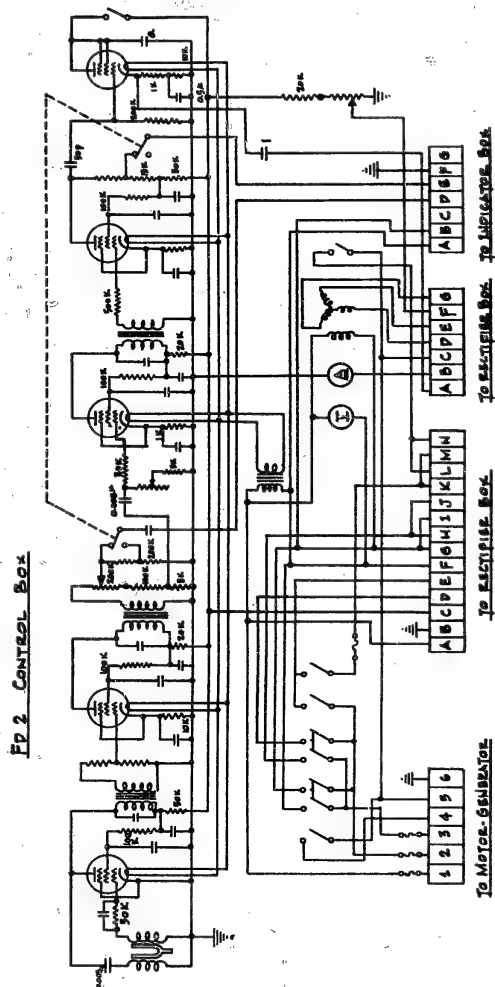
TYPE 18, MK 6, MOD 2 (FD-1) RADAR



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ENCLOSURE (G)

TYPE 18, MK 6, (FD-2) RADAR



ENCLOSURE (G), continued

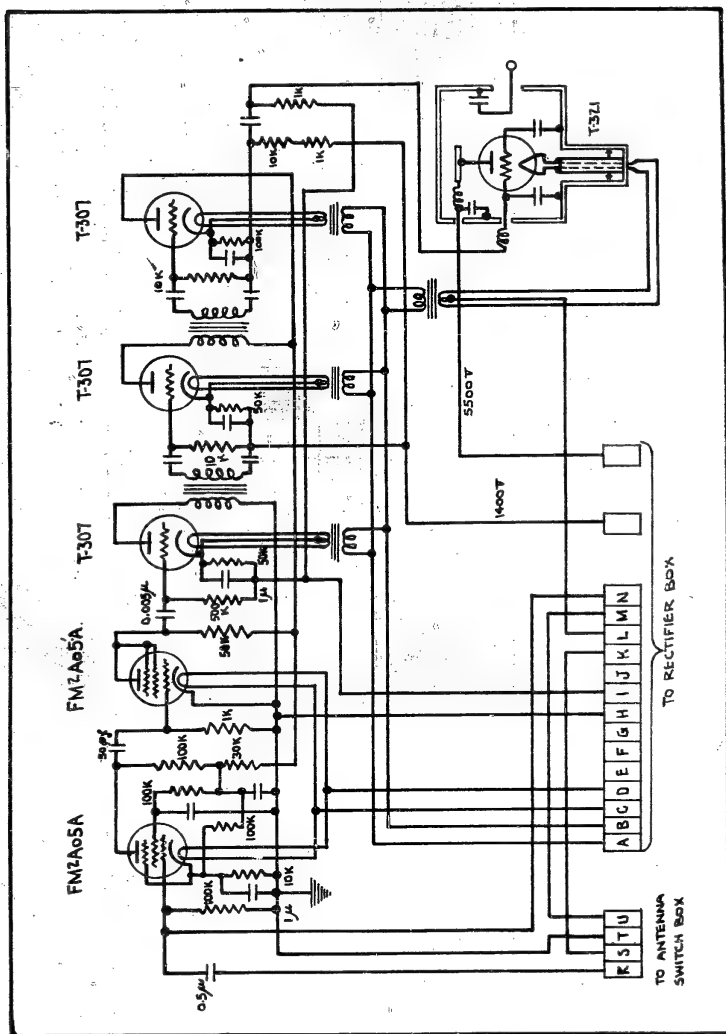


Figure 3(G)
TRANSMITTER

ENCLOSURE (G), continued

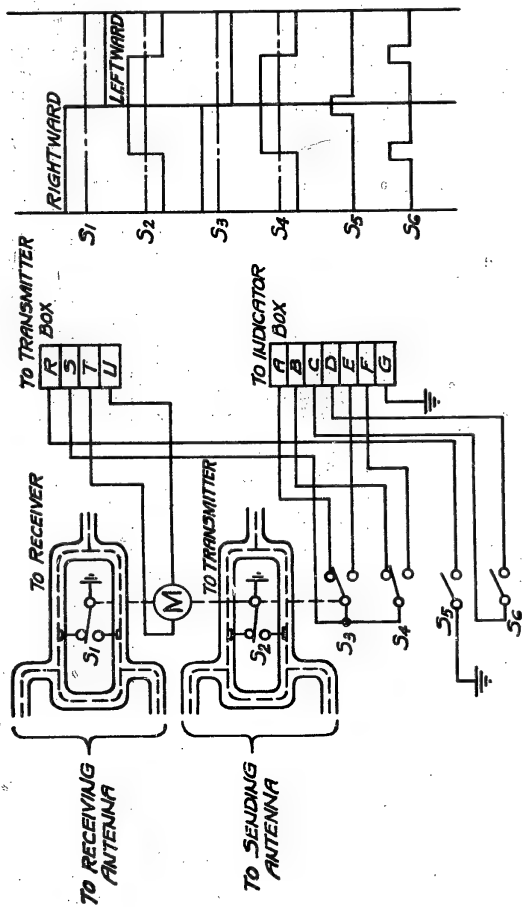
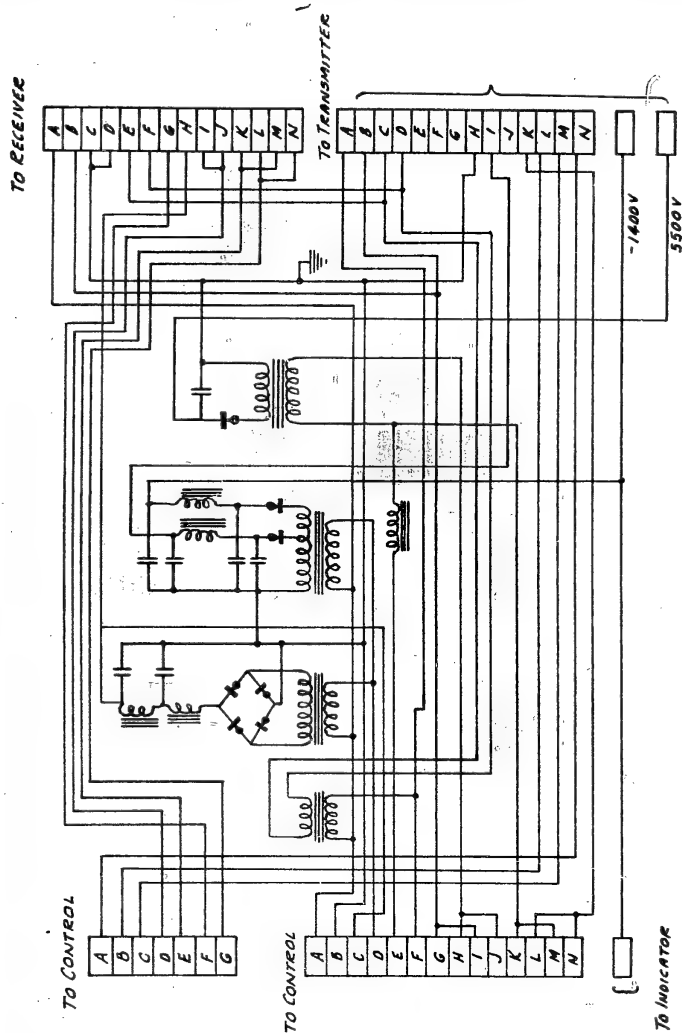
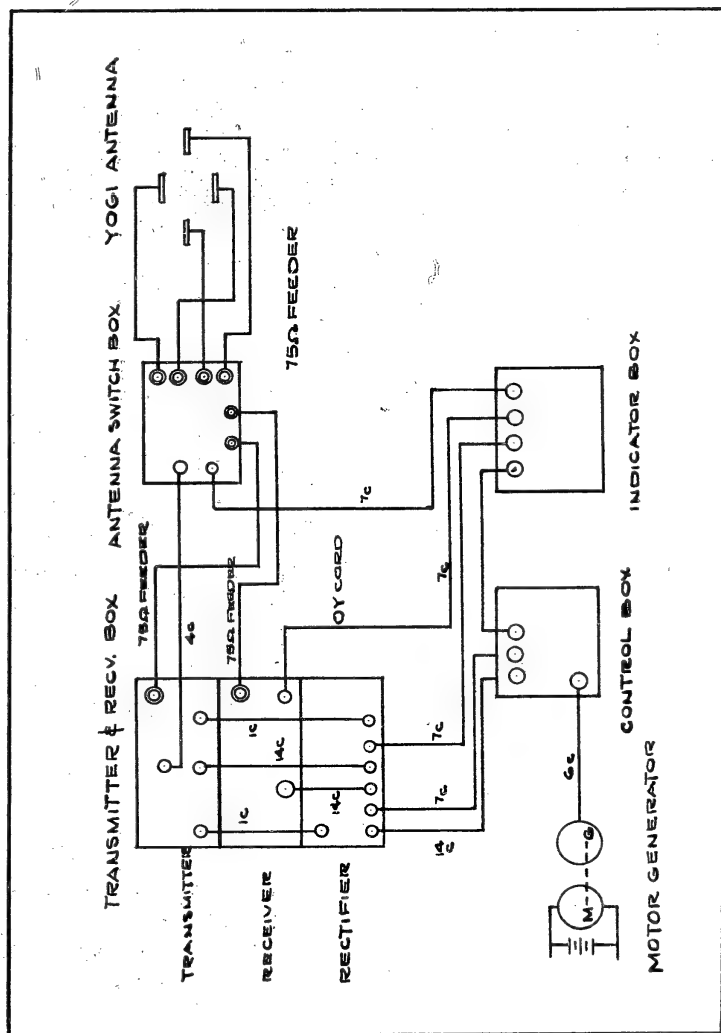


Figure 5(G)
ANTENNA SWITCHING BOX

ENCLOSURE (G), continued

FIGURE 6(G)
POWER SUPPLY

ENCLOSURE (G), continued

Figure 7(G)
CONTROL CIRCUIT BLOCK DIAGRAM

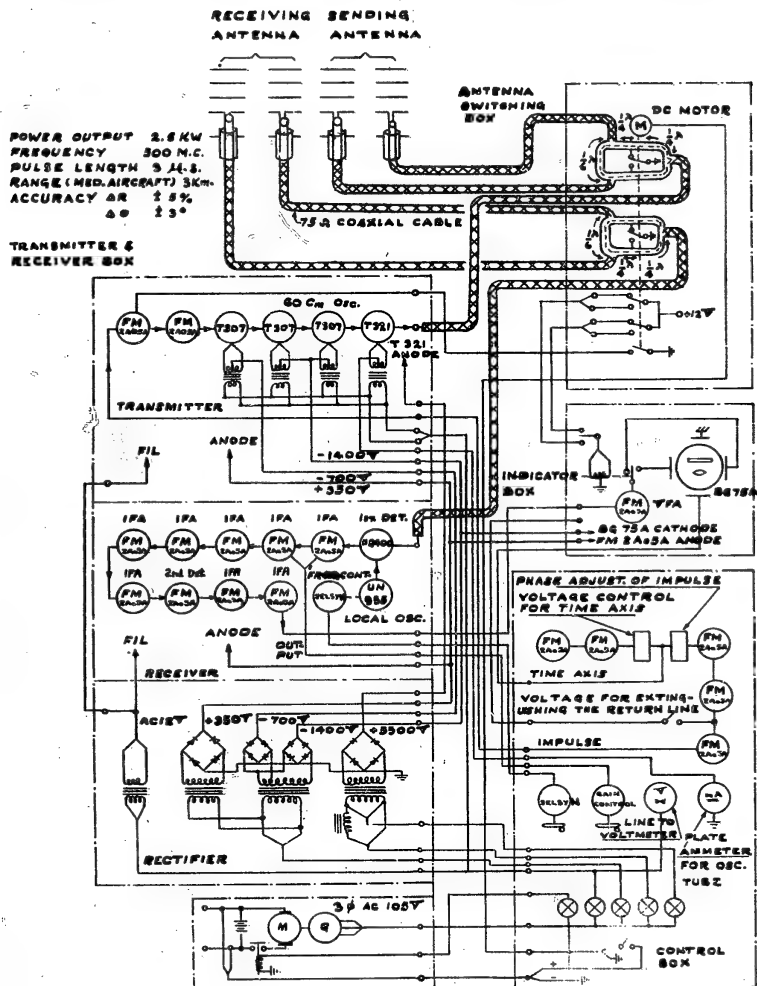
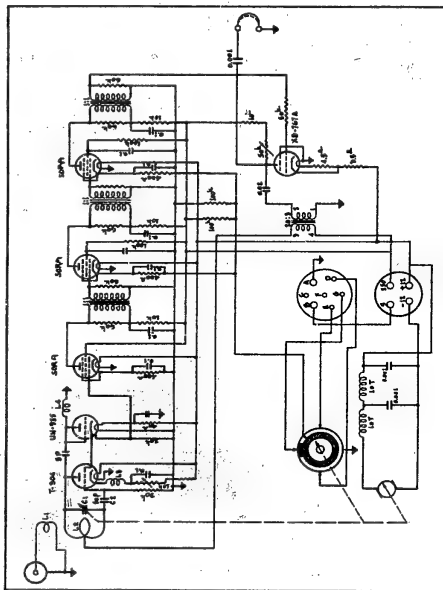


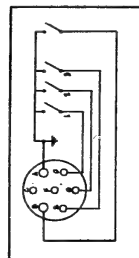
Figure 8(G)
CONTROL CIRCUIT DETAIL BLOCK DIAGRAM

ENCLOSURE (H)

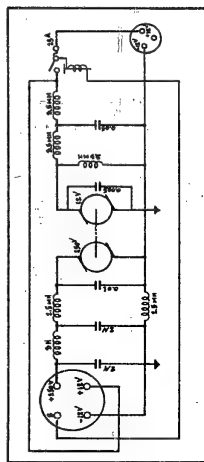
M-13 IFF



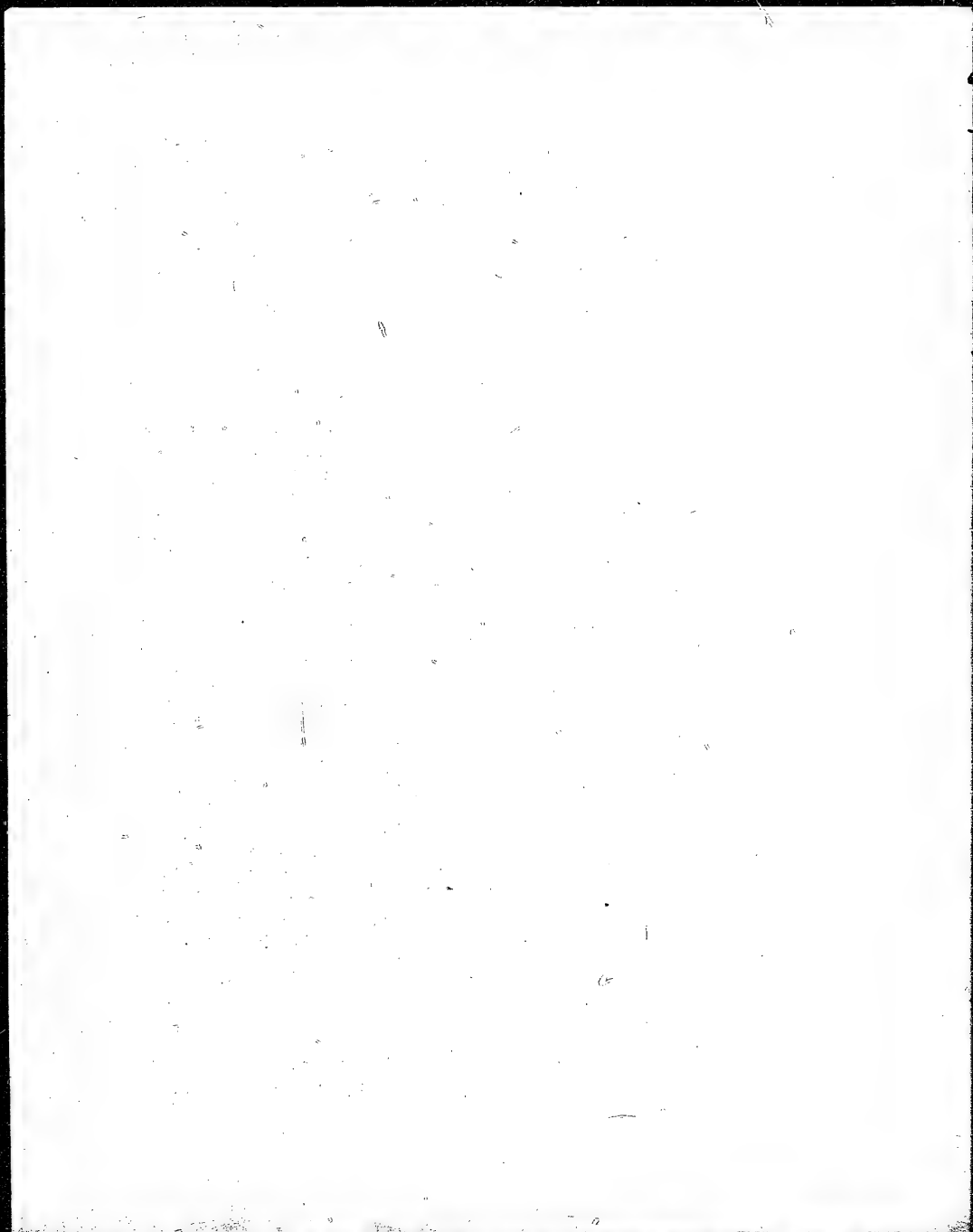
TRANSMITTER-RECEIVER



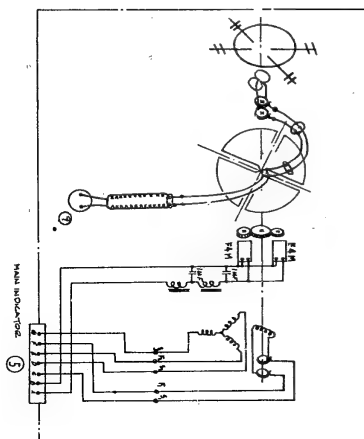
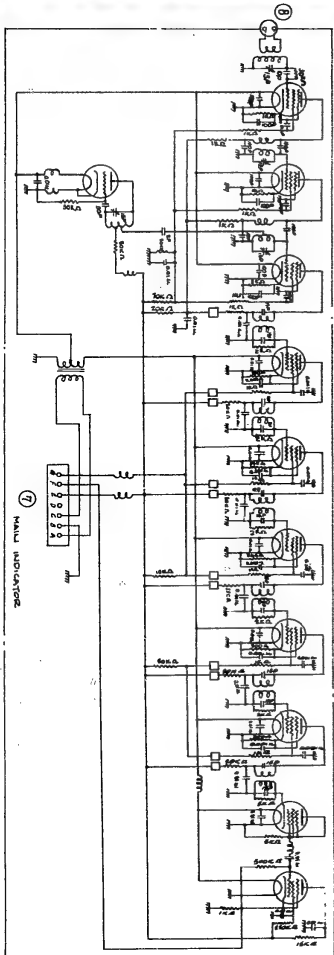
CONTROLLER



19 TEST GENERATOR

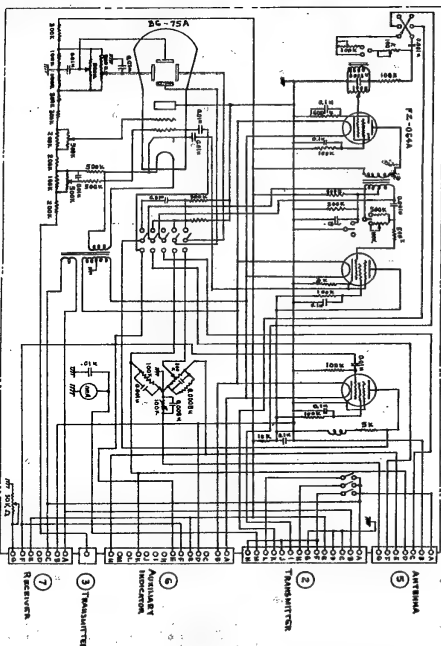


PLAN OF TAMA MARK 3 RECEIVER CIRCUIT



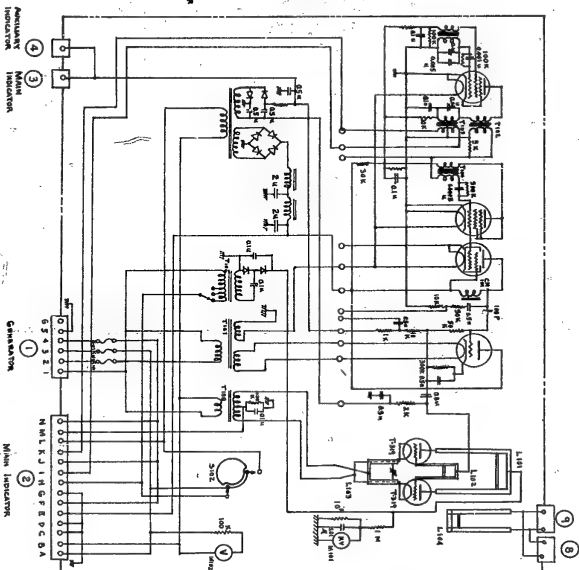
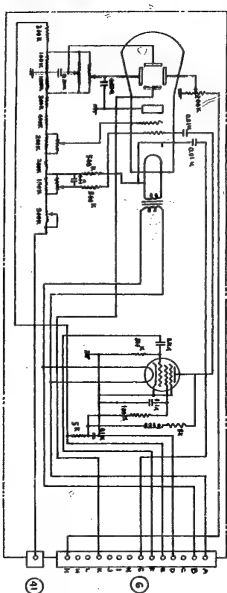
Plan of Tama Mark 3 Antenna Circuit

Plan of TAMA MARK 3 INDICATOR CIRCUIT



AUXILIARY INDICATOR

RG-75A



AUXILIARY INDICATOR

MAIN INDICATOR

GENERATOR

ENCLOSURE (I), continued

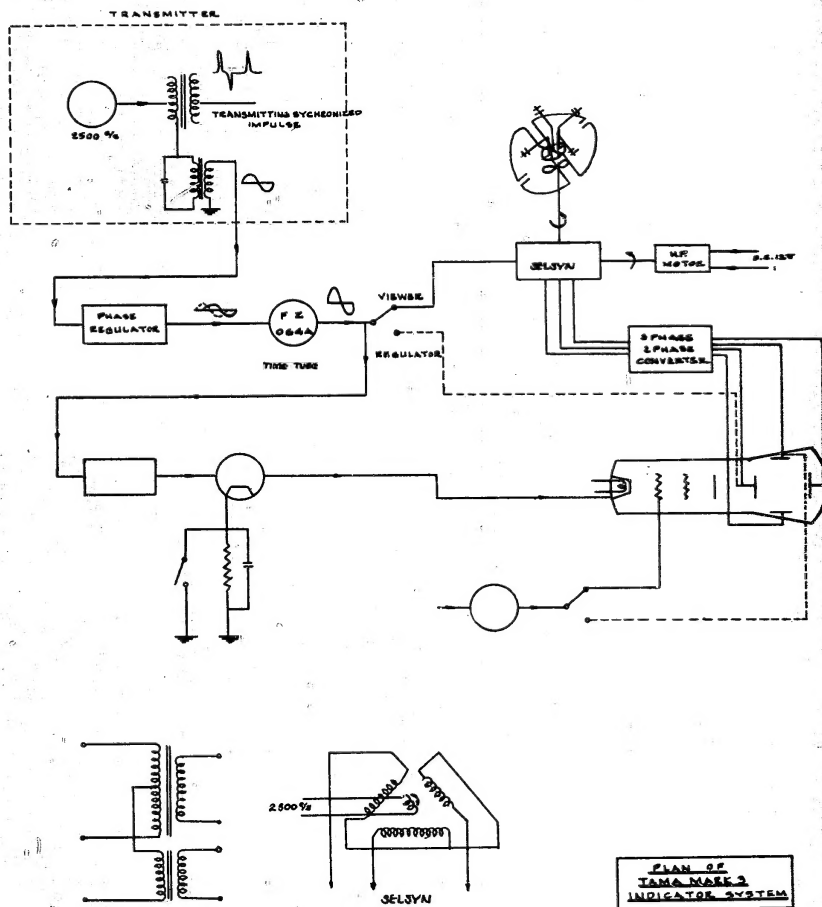


Figure 2(II)

ENCLOSURE (I), continued

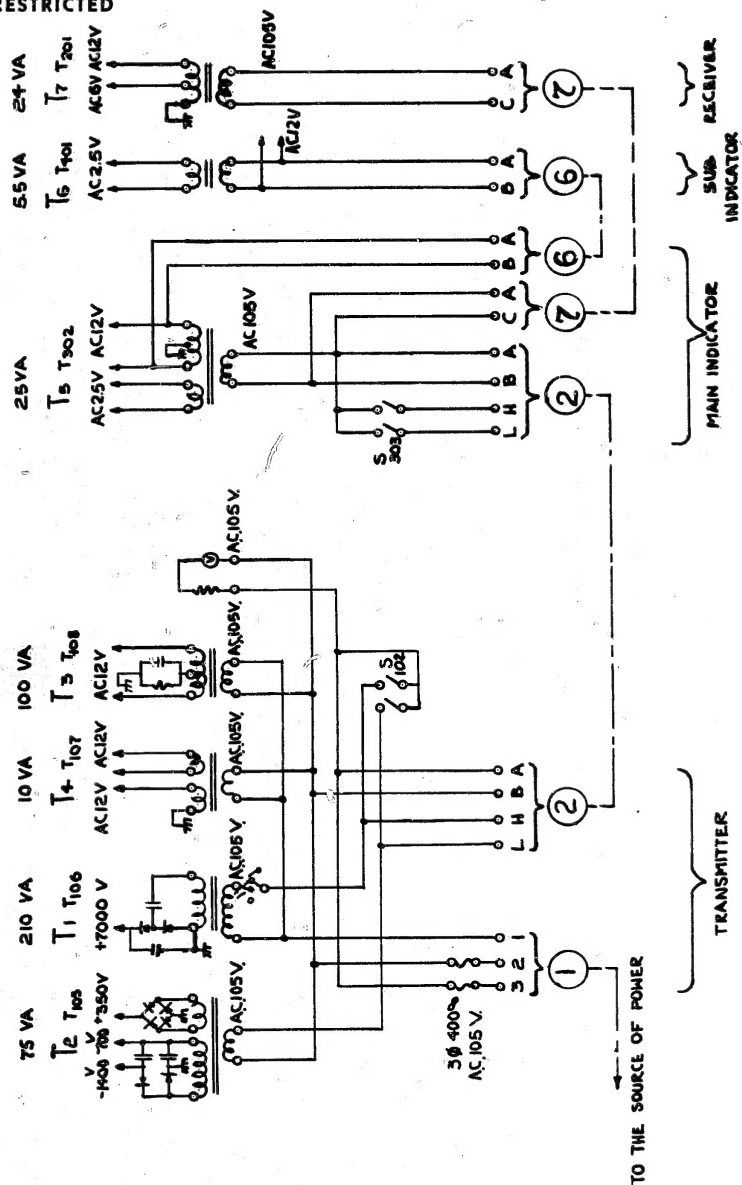
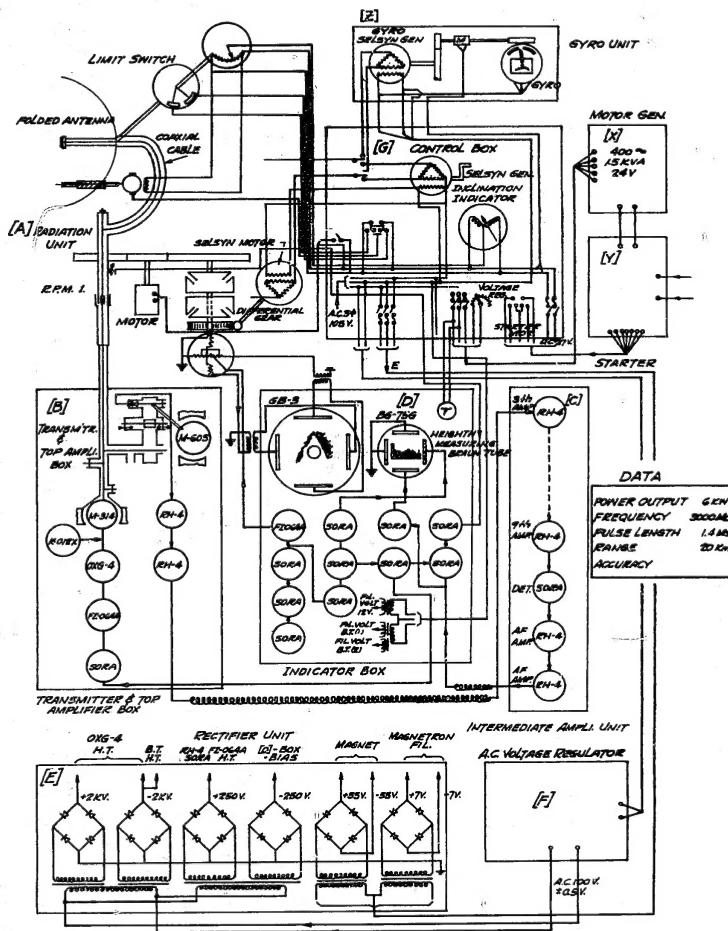


Figure 3(1)
PLAN OF TAMA MARK 3 A.C. ELECTRIC CIRCUIT SYSTEM

ENCLOSURE (J)

Type 51 Radar



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CHART OF JAPANESE AIRBORNE RADAR CHARACTERISTICS.

ENCLOSURE (K)

No.	Name	Radio	Object	Search	Range	Installation	Frequency	Power	Pulse	Position	Transmitter	Receiver	Local	Q	Scale	Type	Gain	Beam	Effective	Minimum	Accuracy	Distance	Accuracy	Angle	Score	Notes	No. of	Remarks	Remarks
1	Type-1 Air Main-2 Model-1 Radio	10-6	Search and search	10-6	10-6	Large and Small Aircraft, Observer's Ship	20	20w	10-6	1000/s	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6
2	Type-2 Air Main-2 Model-2 Radio	10-6	Search and search	10-6	10-6	Large and Small Aircraft, Observer's Ship	20	20w	10-6	1000/s	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6
3	Type-3 Air Main-2 Model-3 Radio	10-6	Search and search	10-6	10-6	Large and Small Aircraft, Observer's Ship	20	20w	10-6	1000/s	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6
4	Type-4 Air Main-2 Model-4 Radio	10-6	Search and search	10-6	10-6	Large and Small Aircraft, Observer's Ship	20	20w	10-6	1000/s	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6
5	Type-5 Air Main-2 Model-5 Radio	10-6	Search and search	10-6	10-6	Large and Small Aircraft, Observer's Ship	20	20w	10-6	1000/s	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6
6	Type-6 Air Main-2 Model-6 Radio	10-6	Search and search	10-6	10-6	Large and Small Aircraft, Observer's Ship	20	20w	10-6	1000/s	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6
7	Type-7 Air Main-2 Model-7 Radio	10-6	Search and search	10-6	10-6	Large and Small Aircraft, Observer's Ship	20	20w	10-6	1000/s	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6
8	Type-8 Air Main-2 Model-8 Radio	10-6	Search and search	10-6	10-6	Large and Small Aircraft, Observer's Ship	20	20w	10-6	1000/s	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6
9	Type-9 Air Main-2 Model-9 Radio	10-6	Search and search	10-6	10-6	Large and Small Aircraft, Observer's Ship	20	20w	10-6	1000/s	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6
10	Type-10 Air Main-2 Model-10 Radio	10-6	Search and search	10-6	10-6	Large and Small Aircraft, Observer's Ship	20	20w	10-6	1000/s	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6
11	Type-11 Air Main-2 Model-11 Radio	10-6	Search and search	10-6	10-6	Large and Small Aircraft, Observer's Ship	20	20w	10-6	1000/s	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6
12	Type-12 Air Main-2 Model-12 Radio	10-6	Search and search	10-6	10-6	Large and Small Aircraft, Observer's Ship	20	20w	10-6	1000/s	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6
13	Type-13 Air Main-2 Model-13 Radio	10-6	Search and search	10-6	10-6	Large and Small Aircraft, Observer's Ship	20	20w	10-6	1000/s	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6	10-6